ADAPTING WATER RESOURCES MANAGEMENT TO CLIMATE CHANGE CONDITIONS IN THE ARAL SEA BASIN

by

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Abstract

Great natural climate variability in the Aral Sea Basin is supplemented by both global (increased concentration of greenhouse gases in the atmosphere) and local (urbanization, expansion of irrigated lands, creation of reservoirs and artificial drainage lakes, and depletion of the Aral Sea) anthropogenic impacts. From the analysis of climatic parameters, one can conclude that aridity is intensifying. Upward trends for aridity become more apparent in summer and autumn under great variability. In time, summer months will contribute more to the annual aridity trend, and identified changes will make land degradation processes more intensive throughout the region. In light of expected climate change, it is necessary to develop such ways for adaptation that make use of positive aspects of the forecasted processes and remove negative consequences. Together with the specialists of McGill University (Canada) climate change adaptation research with respect to water resources was implemented on farms in Uzbekistan, Kazakhstan, and Tadjikistan. The research was intended to study and demonstrate the possible ways to increase food crop productivity and improve irrigation efficiency under the conditions of aridization forecasted for the region. In this context, the feasibility of growing of watermelons and maize under light plastic film, tunneling plastic film, and photodegradable plastic film were evaluated. Every furrow and alternate furrow irrigation methods were studied. The program ISAREG, designed at the Lisbon Technical University in the Department of Agricultural Engineering, Instituto Superior de Agronomia was used. The best results were achieved in growing crops under light plastic film. Crops grown under light plastic film were gathered 3 weeks earlier and agricultural output increased 1,5 times compared to control option without film. Yield increase under these conditions of plastic mulching and soil water conservation after irrigation allowed us to raise productivity of the irrigation water. Achieved results will be used in the practical training of farmers.